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**21** Secure high data embedding rate for steganographic application

Faisal Alturki, Russell Mersereau

November 2000 **Proceedings of the 2000 ACM workshops on Multimedia**

Publisher: ACM Press

Full text available: [pdf\(632.20 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Data hiding is the process of secretly embedding information inside a data source without changing its perceptual quality or its statistical properties. In this paper we present a new data hiding technique for embedding a high data rate in the transform domain. This technique is suitable for applications such as covert communication and captioning. The technique is based on increasing the number of image transform coefficients used to carry the information by decorrelating the image samples i ...

**Keywords:** data embedding, data security, steganography, watermarking

**22** VLSI architecture for lossless compression of medical images using the discrete wavelet transform

I. Urriza, J. I. Artigas, J. I. García, L. A. Barragán, D. Navarro

February 1998 **Proceedings of the conference on Design, automation and test in Europe**

Publisher: IEEE Computer Society

Full text available: [pdf\(58.57 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

[Publisher Site](#)

This paper presents a VLSI Architecture to implement the forward and inverse 2-D Discrete Wavelet Transform (FDWT/IDWT), to compress medical images for storage and retrieval. Lossless compression is usually required in the medical image field. The word length required for lossless compression makes too expensive the area cost of the architectures that appear in the literature. Thus, there is a clear need for designing an architecture to implement the lossless compression of medical images using ...

**Keywords:** Medical Image compression, VLSI architectures, DWT

**23** Energy aware lossless data compression

Kenneth Barr, Krste Asanović

May 2003 **Proceedings of the 1st international conference on Mobile systems,**

**applications and services MobiSys '03** **Publisher:** ACM PressFull text available:  [pdf\(299.94 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

Wireless transmission of a bit can require over 1000 times more energy than a single 32-bit computation. It would therefore seem desirable to perform significant computation to reduce the number of bits transmitted. If the energy required to compress data is less than the energy required to send it, there is a net energy savings and consequently, a longer battery life for portable computers. This paper reports on the energy of lossless data compressors as measured on a StrongARM SA-110 system. W ...

**24 Progressive lossless compression of arbitrary simplicial complexes**  **Pierre-Marie Gandois, Olivier Devillers****July 2002 ACM Transactions on Graphics (TOG) , Proceedings of the 29th annual conference on Computer graphics and interactive techniques SIGGRAPH '02, Volume 21 Issue 3****Publisher:** ACM PressFull text available:  [pdf\(8.88 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Efficient algorithms for compressing geometric data have been widely developed in the recent years, but they are mainly designed for closed polyhedral surfaces which are *manifold* or "nearly manifold". We propose here a *progressive* geometry compression scheme which can handle manifold models as well as "triangle soups" and 3D tetrahedral meshes. The method is lossless when the decompression is complete which is extremely important in some domains such as medical or finite element. Wh ...

**Keywords:** coding, interactivity, mesh compression, non manifold meshes, progressivity

**25 Progressive compression for lossless transmission of triangle meshes**  **Pierre Alliez, Mathieu Desbrun****August 2001 Proceedings of the 28th annual conference on Computer graphics and interactive techniques****Publisher:** ACM PressFull text available:  [pdf\(10.06 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Lossless transmission of 3D meshes is a very challenging and timely problem for many applications, ranging from collaborative design to engineering. Additionally, frequent delays in transmissions call for progressive transmission in order for the end user to receive useful successive refinements of the final mesh. In this paper, we present a novel, fully progressive encoding approach for lossless transmission of triangle meshes with a very fine granularity. A new valence-driven decimating con ...

**Keywords:** connectivity encoding, geometry encoding, levels of details, mesh decimation, progressive transmission, triangle mesh compression

**26 The client's side of the World-Wide Web**  **Hal Berghel****January 1996 Communications of the ACM, Volume 39 Issue 1****Publisher:** ACM PressFull text available:  [pdf\(444.33 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**27 A lossless smoothing algorithm for compressed video**

Simon S. Lam, Simon Chow, David K. Y. Yau

October 1996 **IEEE/ACM Transactions on Networking (TON)**, Volume 4 Issue 5**Publisher:** IEEE PressFull text available:  [pdf\(1.13 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)**28 Special issue on independent components analysis: ICA for watermarking digital images**

Stéphane Bounkong, Borémi Toch, David Saad, David Lowe

December 2003 **The Journal of Machine Learning Research**, Volume 4**Publisher:** MIT PressFull text available:  [pdf\(554.76 KB\)](#) Additional Information: [full citation](#), [abstract](#), [index terms](#)

We present a domain-independent ICA-based approach to watermarking. This approach can be used on images, music or video to embed either a robust or fragile watermark. In the case of robust watermarking, the method shows high information rate and robustness against malicious and non-malicious attacks, while keeping a low induced distortion. The fragile watermarking scheme, on the other hand, shows high sensitivity to tampering attempts while keeping the requirement for high information rate and lo ...

**29 Robust digital watermarking: An audio watermarking scheme robust against stereo attacks**

David Megías, J. Herrera-Joancomartí, Julià Minguillón

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04****Publisher:** ACM PressFull text available:  [pdf\(191.73 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper, a watermarking scheme for both monophonic and stereophonic audio files is presented. The suggested method uses MPEG 1 Layer 3 compression to determine where and how the embedded mark must be introduced, combined with an error correcting code and a majority voting scheme. The scheme is shown to achieve high robustness against malicious attacks while maintaining a reasonable imperceptibility. The mark is embedded by modifying the magnitude of the spectrum at certain frequencies whic ...

**Keywords:** audio watermarking, copyright protection, frequency domain methods**30 Robust digital watermarking: Digital image watermarking using complex wavelet transform**

Nataša Terzija, Walter Geisselhardt

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04****Publisher:** ACM PressFull text available:  [pdf\(713.64 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper a new robust digital image watermarking method based on the Complex Wavelet Transform is presented. For improving its robustness features in the algorithm design the Error Correction Code is used. The technique is performed in spatial domain. The Complex wavelet transform is firstly used to adapt the watermark to the local image activity by using the visual masking. Secondly it is implemented to select the embedding space (embedding channels). The two embedding channels are obtaine ...

**Keywords:** attacks, complex wavelet transform, image processing, robust algorithms, watermarking

**31 Watermarking: Resolution and quality scalable spread spectrum image watermarking** 

Angela Piper, Reihaneh Safavi-Naini, Alfred Mertins  
◆ August 2005 **Proceedings of the 7th workshop on Multimedia and security MM&Sec '05**

**Publisher:** ACM Press

Full text available:  pdf(238.35 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

If digital watermarking is to adequately protect content in systems which provide both resolution and quality scalability, then the watermarking algorithms used must provide both resolution and quality scalability. Although there exists a tradeoff between resolution and quality scalability, we demonstrate that it is possible to achieve both types by taking advantage of human visual system characteristics to increase quality scalability without compromising resolution scalability. To this end, we ...

**Keywords:** digital watermarking, scalable, texture analysis

**32 Bayesian networks for lossless dataset compression** 

◆ Scott Davies, Andrew Moore  
◆ August 1999 **Proceedings of the fifth ACM SIGKDD international conference on Knowledge discovery and data mining**

**Publisher:** ACM Press

Full text available:  pdf(638.07 KB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**33 Performance optimization of wireless local area networks through VLSI data compression** 

Bongjin Jung, Wayne P. Burleson  
January 1998 **Wireless Networks**, Volume 4 Issue 1

**Publisher:** Kluwer Academic Publishers

Full text available:  pdf(664.69 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In contrast to wireline communication, the physical bandwidth of RF wireless communication systems is relatively limited and is unlikely to grow significantly in the future. Hence it is advantageous to increase the effective bandwidth of communication channels at the expense of complex processing at both the sending and receiving entities.

In this paper we present a real-time, low-area, and low-power VLSI lossless data compressor based on the first Lempel-Ziv algorithm (Ziv and Lempel, 1977 ...

**34 Biometrics, watermarking, IKE: A new content-based digital audio watermarking algorithm for copyright protection** 

◆ Xiang-yang Wang, Yong-rui Cui, Hong-ying Yang, Hong Zhao  
November 2004 **Proceedings of the 3rd international conference on Information security InfoSecu '04**

**Publisher:** ACM Press

Full text available:  pdf(563.54 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Digital audio watermarking embeds inaudible information into digital audio data for the purposes of copyright protection, ownership verification, convert communication, and/or auxiliary data carrying. In this paper, we present a novel watermarking scheme to embed a meaningful gray image into digital audio by quantizing the wavelet coefficients (using integer lifting wavelet transform) of audio samples. Our audio-dependent watermarking procedure directly exploits temporal and frequency perceptual ...

**Keywords:** digital audio, digital watermarking, human auditory system, integer lifting wavelet transform, quantization

**35 Computer applications in health care (CAHC): Compression of mammograms for** 

**◆ medical practice**

Artur Przelaskowski

March 2004 **Proceedings of the 2004 ACM symposium on Applied computing**

**Publisher:** ACM Press

Full text available:  pdf(244.15 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper considers effective compression methods for mammogram storing and interchange. A controversy problem of irreversible compression of medical images is studied in clinical tests to check usefulness and possibility of acceptance of wavelet-based compression for clinical applications. Diagnostic accuracy is measured in abnormality detection tests with ROC-based analysis, and by subjective rating of diagnostically important image features affecting lesion symptoms and image ordering accord ...

**Keywords:** diagnostic accuracy evaluation, image compression

**36 Robust digital watermarking: Robust DWT-SVD domain image watermarking:** 

**◆ embedding data in all frequencies**

Emir Ganic, Ahmet M. Eskicioglu

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

**Publisher:** ACM Press

Full text available:  pdf(4.84 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Protection of digital multimedia content has become an increasingly important issue for content owners and service providers. As watermarking is identified as a major technology to achieve copyright protection, the relevant literature includes several distinct approaches for embedding data into a multimedia element (primarily images, audio, and video). Because of its growing popularity, the Discrete Wavelet Transform (DWT) is commonly used in recent watermarking schemes. In a DWT-based scheme, t ...

**Keywords:** copyright protection, discrete wavelet transform, image watermarking, multimedia, singular value decomposition, visual watermark

**37 Authentication I: Multimedia authentication with sensor-based watermarking** 

**◆ Zheng Liu, Xue Li, Zhaoyang Dong**

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

**Publisher:** ACM Press

Full text available:  pdf(399.04 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Fragile/semi-fragile watermarking are important methods for authenticating multimedia contents. The watermark must be sensitive to malicious attacks. However, at the same time, it also has to be insensitive to allowed modifications. In practice, the definitions of "allowed modifications" are various. It is difficult to satisfy multiple users having different authentication requirements with a fixed algorithm. In this paper, we introduced a novel "sensor-based" authentication watermarking with th ...

**Keywords:** authentication, fragile watermarking, fuzzy identification system

**38 JPEG2000: the new still picture compression standard**

◆ C. A. Christopoulos, T. Ebrahimi, A. N. Skodras

◆ November 2000 **Proceedings of the 2000 ACM workshops on Multimedia****Publisher:** ACM PressFull text available: [pdf\(790.51 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

*This paper presents an overview of the upcoming JPEG2000 still picture compression standard. JPEG2000 is not only intended to provide rate-distortion and subjective image quality performance superior to existing JPEG standard, but to also provide functionality that the current JPEG standard can either not address efficiently nor address at all.*

*Lossless and lossy compression, encoding of very large images, progressive transmission by pixel accuracy and by resolution, robustness to the pres ...*

**Keywords:** *JPEG, colour image coding, data compression, source coding, subband coding, wavelet transform*

**39 Robust MPEG video watermarking technologies**

◆ Jana Dittmann, Mark Stabenau, Ralf Steinmetz

◆ September 1998 **Proceedings of the sixth ACM international conference on Multimedia****Publisher:** ACM PressFull text available: [pdf\(1.03 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** *copyright protection, digital watermarking for MPEG video, security and the media*

**40 Meshes II: Geometry-guided progressive lossless 3D mesh coding with octree (OT)**◆ decomposition

Jingliang Peng, C.-C. Jay Kuo

July 2005 **ACM Transactions on Graphics (TOG)**, Volume 24 Issue 3**Publisher:** ACM PressFull text available: [pdf\(591.68 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

A new progressive lossless 3D triangular mesh encoder is proposed in this work, which can encode any 3D triangular mesh with an arbitrary topological structure. Given a mesh, the quantized 3D vertices are first partitioned into an octree (OT) structure, which is then traversed from the root and gradually to the leaves. During the traversal, each 3D cell in the tree front is subdivided into eight childcells. For each cell subdivision, both local geometry and connectivity changes are encoded, wher ...

**Keywords:** *3D geometry compression, mesh compression, non-manifold mesh, progressive lossless coding, triangle soup*

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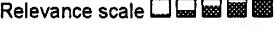
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**1** [Authentication II: Fragile watermarking scheme based on the block-wise dependence in the wavelet domain](#)   
 ◇ [Huayin Si, Chang-Tsun Li](#)  
 September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**  
 Publisher: ACM Press  
 Full text available:  [pdf\(474.23 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)  
 In transform-domain fragile watermarking schemes for authentication purposes, a common practice is to watermark some selected transform coefficients in order to achieve low embedding distortion. However, we point out in this work that leaving most of the coefficients, usually the low frequency and zero-valued ones, unmarked opens wide security gap for attacks to be mounted on them. In this work, a fragile watermarking scheme is proposed to implicitly watermark all the coefficients by registering ...

**Keywords:** fragile watermarking, multimedia security, non-deterministic block-wise dependence, selective embedding algorithm

**2** [Protecting digital media content](#)   
 ◇ [Nasir Memon, Ping Wah Wong](#)  
 July 1998 **Communications of the ACM**, Volume 41 Issue 7  
 Publisher: ACM Press  
 Full text available:  [pdf\(1.02 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#), [review](#)

**3** [Encryption: Parameterized biorthogonal wavelet lifting for lightweight JPEG 2000 transparent encryption](#)   
 ◇ [Dominik Engel, Andreas Uhl](#)  
 August 2005 **Proceedings of the 7th workshop on Multimedia and security MM&Sec '05**  
 Publisher: ACM Press  
 Full text available:  [pdf\(1.24 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)  
 Lightweight encryption offers a cogent alternative to full encryption of visual content in application settings with clients of low processing power, e.g. mobile applications, as it

counterbalances security demands and computational demands. We present a lightweight transparent encryption scheme for JPEG 2000 that is based on and integrated into the wavelet lifting scheme. Keys are constructed from parameterized biorthogonal filters. The proposed method comes at extremely low computational cost ...

**Keywords:** JPEG 2000, lightweight encryption, parameterized biorthogonal wavelet lifting, transparent encryption

**4 Progressive quantized projection watermarking scheme**

◆ Masoud Alghoniemy, Ahmed H. Tewfik  
◆ October 1999 **Proceedings of the seventh ACM international conference on Multimedia (Part 1)**  
Publisher: ACM Press

Full text available:  [pdf\(788.19 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

In this paper we present a new watermarking technique for digital images. Our approach modifies blocks of the image after projecting them onto certain directions. By quantizing the projected blocks to even and odd values we can represent the hidden information properly. The proposed algorithm does the modification progressively to ensure successful data extraction without any prior information being sent to the receiver side. In order to increase the robustness of our watermark to scaling a ...

**5 Introduction to the ACM multimedia and security workshop**

◆ Jana Dittmann, Jessica Fridrich  
◆ September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**  
Publisher: ACM Press

Full text available:  [pdf\(153.53 KB\)](#) Additional Information: [full citation](#), [references](#)

**6 Steganography I: Statistical characterisation of MP3 encoders for steganalysis**

◆ Rainer Böhme, Andreas Westfeld  
◆ September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**  
Publisher: ACM Press

Full text available:  [pdf\(254.36 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper outlines a strategy to discriminate different ISO/MPEG 1 Audio Layer-3 (MP3) encoding programs by statistical particularities of the compressed audio streams. We use Bayesian logic to deduce the most probable encoder on the basis of a feature vector that can be extracted from arbitrary MP3 files. All appropriate features used for the classification are discussed and example results for sets of test data from 20 different codecs are given. Possible applications include advances in info ...

**Keywords:** MP3 encoder classification, digital forensics, steganalysis

**7 Robust digital watermarking: Digital image watermarking using complex wavelet**

◆ transform  
◆ Nataša Terzija, Walter Geisselhardt  
◆ September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**  
Publisher: ACM Press

Full text available: Additional Information:

 pdf(713.64 KB)[full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper a new robust digital image watermarking method based on the Complex Wavelet Transform is presented. For improving its robustness features in the algorithm design the Error Correction Code is used. The technique is performed in spatial domain. The Complex wavelet transform is firstly used to adapt the watermark to the local image activity by using the visual masking. Secondly it is implemented to select the embedding space (embedding channels). The two embedding channels are obtaine ...

**Keywords:** attacks, complex wavelet transform, image processing, robust algorithms, watermarking

8 [Biometrics, watermarking, IKE: A new content-based digital audio watermarking](#) 

 [algorithm for copyright protection](#)

Xiang-yang Wang, Yong-rui Cui, Hong-ying Yang, Hong Zhao

November 2004 **Proceedings of the 3rd international conference on Information security InfoSecu '04**

**Publisher:** ACM Press

Full text available:  pdf(563.54 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Digital audio watermarking embeds inaudible information into digital audio data for the purposes of copyright protection, ownership verification, convert communication, and/or auxiliary data carrying. In this paper, we present a novel watermarking scheme to embed a meaningful gray image into digital audio by quantizing the wavelet coefficients (using integer lifting wavelet transform) of audio samples. Our audio-dependent watermarking procedure directly exploits temporal and frequency perceptual ...

**Keywords:** digital audio, digital watermarking, human auditory system, integer lifting wavelet transform, quantization

9 [Robust digital watermarking: Robust DWT-SVD domain image watermarking:](#) 

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Emir Ganic, Ahmet M. Eskicioglu

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

**Publisher:** ACM Press

Full text available:  pdf(4.84 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Protection of digital multimedia content has become an increasingly important issue for content owners and service providers. As watermarking is identified as a major technology to achieve copyright protection, the relevant literature includes several distinct approaches for embedding data into a multimedia element (primarily images, audio, and video). Because of its growing popularity, the Discrete Wavelet Transform (DWT) is commonly used in recent watermarking schemes. In a DWT-based scheme, t ...

**Keywords:** copyright protection, discrete wavelet transform, image watermarking, multimedia, singular value decomposition, visual watermark

10 [Power optimization for real-time and media-rich embedded systems: Proxy-based](#) 

 [task partitioning of watermarking algorithms for reducing energy consumption in mobile devices](#)

Arun Kejariwal, Sumit Gupta, Alexandru Nicolau, Nikil Dutt, Rajesh Gupta

June 2004 **Proceedings of the 41st annual conference on Design automation**

**Publisher:** ACM Press

Full text available:  pdf(494.20 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Digital watermarking is a process that embeds an imperceptible signature or watermark in a digital file containing audio, image, text or video data. The watermark is later used to authenticate the data file and for tamper detection. It is particularly valuable in the use and exchange of digital media such as audio and video on emerging handheld devices. However, watermarking is computationally expensive and adds to the drain of the available energy in handheld devices. We present an approach in ...

**Keywords:** handhelds, partitioning, proxy, watermarking

**11 Audio watermarking for monitoring and copy protection**



 Jaap Haitsma, Michiel van der Veen, Ton Kalker, Fons Bruekers

November 2000 **Proceedings of the 2000 ACM workshops on Multimedia**

**Publisher:** ACM Press

Full text available:  pdf(313.49 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Based on existing technology used in image and video watermarking, we have developed a robust audio watermarking technique. The embedding algorithm operates in frequency domain, where the magnitudes of the Fourier coefficients are slightly modified. In the temporal domain, an additional scale parameter and gain function are necessary to refine the watermark and achieve perceptual transparency. Watermark detection relies on the Symmetrical Phase Only Matched Filtering (SPOMF) cross-correlation ...

**Keywords:** audio, broadcast monitoring, copy protection, watermark detection, watermark embedding

**12 Technical poster session 3: multimedia tools, end-systems, and applications: A**



 multiple watermarking algorithm based on CDMA technique

Fuhao Zou, Zhengding Lu, Hefei Ling

October 2004 **Proceedings of the 12th annual ACM international conference on Multimedia**

**Publisher:** ACM Press

Full text available:  pdf(235.47 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper proposes a multiple watermarking algorithm based on code division multiple access (CDMA) technique. Before the watermark embedded, each user uses his private key as a seed to generate an address code which is subjected to pseudorandom noise distribution. Each watermark is modulated into a carrier signal with its corresponding address code. And then these carrier signals are added to host media (e.g. image, video and audio). During watermark detection, using the same address code, e ...

**Keywords:** address code, code division multiple access, correlation coefficient, multiple watermarking

**13 Low power techniques and design tradeoffs in adaptive FIR filtering for PRML read**



 channels

Khurram Muhammad, Robert B. Staszewski, Poras T. Balsara

August 2000 **Proceedings of the 2000 international symposium on Low power electronics and design**

**Publisher:** ACM Press

Full text available:  pdf(249.76 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

In this paper, we describe area and power reduction techniques for a low-latency adaptive finite-impulse response filter for magnetic recording read channel applications. Various techniques are used to reduce area and power dissipation while speed remains as the main performance criterion for the target application. A parallel transposed direct form architecture operates on real-time input data samples and employs a fast, low-area multiplier based on select ...

**14 Coding and Encryption: An image watermarking technique using pyramid transform** 

Qiang Cheng, Thomas S. Huang

October 2001 **Proceedings of the ninth ACM international conference on Multimedia**

**Publisher:** ACM Press

Full text available:  [pdf\(1.90 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

An image watermarking technique based on pyramid transforms is proposed. An arbitrary binary pattern is formed into an effective hypothesized pattern and transmitted as a watermark. Multiresolution pyramid transforms are applied to host images, whose characteristics are exploited to embed the watermark. The detector is designed to be effective to a wide range of original signal sources and noise sources. The scheme is designed to achieve efficient trade-offs between perceptual invisibility, robu ...

**Keywords:** pyramid transfrom, verification coding, watermarking

**15 Watermarking: Improved watermark detection for spread-spectrum based** 

**watermarking using independent component analysis**

Hafiz Malik, Ashfaq Khokhar, Rashid Ansari

November 2005 **Proceedings of the 5th ACM workshop on Digital rights management DRM '05**

**Publisher:** ACM Press

Full text available:  [pdf\(434.70 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents an efficient blind watermark detection/decoding scheme for spread spectrum (SS) based watermarking, exploiting the fact that in SS-based embedding schemes the embedded watermark and the host signal are mutually independent and obey non-Gaussian distribution. The proposed scheme employs the theory of independent component analysis (ICA) and posed the watermark detection as a blind source separation problem. The proposed ICA-based blind detection/decoding scheme has been simula ...

**Keywords:** blind source separation, correlation, detection, independent component analysis, spread spectrum, watermarking

**16 Authentication II: Audio watermarking algorithm for real-time speech integrity and** 

**authentication**

Song Yuan, Sorin A. Huss

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

**Publisher:** ACM Press

Full text available:  [pdf\(259.52 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Data integrity and source origin authentication are essential topics for real-time multimedia systems. But traditional method, such as MAC, is not very applicable to overcome the distortion introduced in real-time multimedia communication. In this paper a new integrity mechanics deploying speech watermarking is presented. The advocated approach adopts public key encryption to efficiently generate non-repudiate speech. In

the last part of the article, a speech watermarking algorithm incorporating ...

**Keywords:** integrity and source origin authentication, real-time multimedia communication and internet telephony, speech watermarking

17 Robust mesh watermarking

◆ Emil Praun, Hugues Hoppe, Adam Finkelstein

July 1999 **Proceedings of the 26th annual conference on Computer graphics and interactive techniques**

Publisher: ACM Press/Addison-Wesley Publishing Co.

Full text available:  [pdf\(2.08 MB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)



**Keywords:** copyright protection, steganography

18 Robust digital watermarking: Key-dependency for a wavelet-based blind

◆ watermarking algorithm

Michael Bracht, Andreas Uhl, Werner Dietl

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

Publisher: ACM Press

Full text available:  [pdf\(355.15 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)



When a host image is watermarked multiple times by the same algorithm collisions can occur. This makes it difficult for an image to host multiple watermarks. But this hosting is necessary for an image distribution chain, where several persons all watermark the same image. Wavelet domain transformations provide several possibilities to customize the transformation process. We discuss the applicability of the methods of wavelet filter parametrization and wavelet packet decomposition for secret wat ...

**Keywords:** blind watermarking, multiple watermarking, parameterized wavelet filters, wavelet packets

19 Watermarking: Approaching optimal value expansion for reversible watermarking

◆ Bian Yang, Martin Schmucker, Christoph Busch, Xiamu Niu, Shenghe Sun

August 2005 **Proceedings of the 7th workshop on Multimedia and security MM&Sec '05**

Publisher: ACM Press

Full text available:  [pdf\(432.86 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)



We investigate in this paper several recently proposed reversible watermarking algorithms based on value expansion schemes: bit-shifting, histogram modification, spread spectrum, companding and prediction-error expansion, and present a general model - histogram expansion - for all value expansion based reversible watermarking algorithms, which demonstrates a unified view of these different algorithms and gives them a performance comparison in terms of watermarking distortion and embedding capaci ...

**Keywords:** histogram expansion, reversible watermarking, value expansion

20 MRPF: An Architectural Transformation for Synthesis of High-Performance and Low-Power Digital Filters

Hunsoo Choo, Khurram Muhammad, Kaushik Roy



March 2003 **Proceedings of the conference on Design, Automation and Test in Europe**  
- Volume 1 DATE '03

**Publisher:** IEEE Computer Society

Full text available: [pdf\(175.70 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [index terms](#)

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We present a graph theoretical methodology that reduces the implementation complexity of a vector multiplied by a scalar. The proposed approach is called MRP (minimally redundant parallel) optimization and is presented in FIR filtering framework to obtain a low-complexity multiplier-less implementation. The key idea is to expand the design space using shift inclusive differential coefficients together with computation reordering using a graph theoretic approach to obtain maximal computation shar ...

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